DOCUMENT RESUME

ED 264 204 SP 026 773

AUTHOR Keenan, Thomas P.
TITLE Electronic Learning: Perspectives on Maintaining an Educational Relationship through Electronic Communication.
PUB DATE Jul 85
NOTE 23p.; Paper presented at the World Assembly of the International Council on Education for Teaching (32nd, Vancouver, British Columbia, Canada, July 22-26, 1985).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Descriptive (141)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academically Gifted; Computer Literacy; Foreign Countries; *Networks; Secondary Education; *Secondary School Students; *Student Attitudes; *Telecommunications
IDENTIFIERS Canada; *Electronic Mail

ABSTRACT

Fifty gifted teenagers from across Canada, who were taught the Honeywell MULTICS "mail" and "forum" systems, were allowed free reign on an electronic communication system for several months. This paper reports on the students' use of the system, and on some of the interesting and unusual events which occurred during the course of the experiment. Among the conclusions discussed are: (1) Electronic communication provided a valuble means for these gifted students to continue their interaction; (2) Several joint projects evolved showing the potential for working together at a distance; (3) Students enjoyed the experience; (4) Students developed a strong "brand loyalty" and resisted attempts to shift them over to other electronic communication systems; and (5) Students went to great lengths to maintain their electronic links, including buying computer equipment and paying long distance charges. The report concludes that future investigations should examine students' use of research databases. (CB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED264204

"Electronic Learning": Perspectives on Maintaining an Educational Relationship Through Electronic Communication

Author: Thomas P. Keenan
Associate Professor, Department of Computer Science
Program Director, Computers and Mathematics,
Faculty of Continuing Education

Institution: The University of Calgary
2500 University Drive N.W.
Calgary, Alberta T2N 1N4
(403) 284-5431

BEST COPY AVAILABLE

Language: English

Session: (Probably) Concurrent Session: Applications of Technology

Keywords: Communication, Distance Delivery, Gifted/Talented, Lifelong Learning

Electronic communication will be a dominant feature of the Canadian social structure within the next decade. "Public access" microcomputer networks such as "The Source" and "Compuserve" report that a significant proportion of their business comes from people "chatting" on the computer. This interaction is entirely distinct from "remote computer use" and business-oriented "electronic mail" in the scope and quality of communication. It has even spawned a bizarre new jargon with elements such as "inverted happy faces!" and etiquette.

This paper examines an experiment in which 50 gifted teenagers from across Canada were allowed "free rein" on an electronic communication system for several months. The students, all participants in the 1984 Calgary program of the Canadian Centre for Creative Technology learned the Honeywell MULTICS "mail" and "forum" systems while on campus. They have continued their electronic friendships for over six months now. This paper reports some of the interesting, unusual, funny, serendipitous and truly bizarre phenomena, and speculates on future implications for how we communicate, and in so doing...practice lifelong learning.

The students have evolved a fascinating system of "electronic brainstorming" which has resulted in very creative solutions to both technical and non-technical problems. As an example, when confronted with the possibility of their electronic lifeline being cut off (for cost reasons) they came up with viable solutions to keep it going.

The author respectfully suggests that a similar type of peer group communication might go a long way towards resolving the problems and feelings of isolation experienced by teachers who are confronted with teaching rapidly evolving disciplines such as Computer Science.

SP026775

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

H. Leavitt

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

(The author was director of the 1984 program cited above, is doing it again this year, and is also the author of the CBC Radio IDEAS series "Crimes of the Future.")

###

BEST COPY AVAILABLE

Electronic Learning: Perspectives on Maintaining an Educational Relationship through Electronic Communication

by

Thomas P. Keenan
Associate Professor
Faculty of Continuing Education
The University of Calgary
2500 University Dr. N.W.
Calgary, Alberta T2N 1N4

Abstract

Electronic communication will be a major force in the social fabric of almost every country in the very near future. The challenge for educators is to use the new technological tools in effective and innovative ways.

This paper examines an experiment in which 50 gifted teenagers from across Canada spent one month together on a University campus. They then returned to their home cities, but most of them maintained contact through a sophisticated electronic mail and computer conferencing system. One year later, the majority are still frequent users of the system, and they have collectively learned such diverse topics as the LISP programming language, some of the fine points of Canadian politics, and, of course, what life is like at their various schools and Universities.

This paper examines some of the barriers found by the students in substituting "electronic" for "face-to-face" communication, and some of the ways in which they overcame them. The techniques described here may provide a good tool for Distance Education, especially when the subject matter is specialized and technical.

BEST COPY AVAILABLE

A Distance Education Problem

Distance Education practitioners are frequently faced with the dilemma of having a small number of students interested in a particular topic, often of a specialized and technical nature. It is often impractical to develop and offer a course for them. With the ever-increasing specialization of knowledge, this "individualized learning need" will become even more prominent.

One solution has been to apply traditional computer-based learning systems. Another, used successfully in the engineering disciplines, has been to link together many centres to deliver courses by television.

This paper concerns another possible approach to this problem - the use of computer conferencing in an environment with a mixture of peers and experts.

Electronic Communication as a New Learning Style

Research into "learning styles" shows that different learners prefer different instructional techniques. Some people are primarily visual, while others are aural or kinesthetic learners. Good teachers recognize this diversity and try to accomodate each learner's particular needs.

With the advent of new technology in information processing and distribution, a variety of "electronic learning" tools are becoming available at reasonable prices. These include computer terminals, stand-alone computers, videotex systems, and interactive videodisks.

BEST COPY AVAILABLE

There is a vast body of work on Computer Assisted Learning (CAL) which shows some major successes, but also many cases in which the medium fell far short of the expectations of both the teacher and the learner. Some of these systems (e.g. PLATO™ from Control Data Corporation,) do allow students to leave messages for tutors and even for the course developers. However, as a general rule, CAL systems involve interaction between the learner and the computer, with little intervention by human experts.

Another model (often called "tele-tutoring",) utilizes one or more teachers at computer terminals to answer students' questions and guide them along. These projects have often stumbled because the tutor is either sitting idle or is swamped with questions and unable to keep up. There are also problems with communicating exactly what the question is, and with typing skills.

One of the objectives of this study was to see if there is indeed a new "learning style" coming out of electronic communication, and if some people may actually prefer it to other instructional techniques.

The "Shad Valley" Program

Since 1981, the Canadian Centre for Creative Technology has run a special program for gifted teenagers.[1] It brings together fifty academically excellent grade 11 and grade 12 high school students for a month of intensive seminars at a University campus. The students then return to their home towns where they usually work for a sponsoring company for the next six weeks. In 1984, for the first time, this program was run in more than one venue -- at The University of Waterloo (the location of its head office) and at the University of

BEST COPY AVAILABLE

Calgary. It was determined that electronic mail would be a good vehicle for inter-program communication. All faculty and staff were given accounts as soon as they were hired, with an attendant savings of thousands of dollars in long-distance telephone charges.

As each student arrived on campus, they were registered on the University of Calgary's Honeywell Multics™ system. They were encouraged to use the electronic mail and conferencing facilities of the computer, as well as applying it for general purpose computing. All fifty students quickly mastered the system and many of them attained an excellent grasp of the Multics™ operating system. (This learning in itself was largely electronic, as the students were encouraged to make use of the extensive "on-line help" routines available on the system.[2])

While there was a great deal of on-line learning during the program, it was supplemented by face-to-face contact. The purely electronic phase began at the conclusion of the residential program, and is the main subject of this paper.

The specific Distance Education problem we faced, as the students departed from the campus, had the following characteristics:

- -geographically scattered client base
- -essentially no money to build or run a system
- -no *a priori* information on what students would want to learn
- -students were gifted and very familiar with computers and electronic mail
- -students were highly motivated to maintain contact
- -some (but not all) of the students had very high levels of computer skill and knowledge

BEST COPY AVAILABLE

A Few Terms

As used in this paper....

Electronic Mail (email) refers to the sending of information between a sender and one or more recipients with knowledge on the part of the sender about who will be receive the message. If the recipient is presently logged on to the computer, the message will usually be delivered immediately. Otherwise it will be available when the user next logs on.

Computer conferencing (cconf) refers to the posting of information on a sort of "electronic bulletin board" usually without advance knowledge as to who will be reading it or replying to it.

Operating System (OS) refers to the "master control program" that directs the operations of a particular computer system.

Tools Provided

The Multics[tm] OS was developed at Massachusettes Institute of Technology and subsequently brought into the commercial marketplace by General Electric Company and later Honeywell Information Systems, Inc. It is characterized by a high degree of security and reliability, making it the system of choice in several military applications in the U.S. and Canada. It is also fair to say that the original design suffered from excessive overhead, though this has to some extent been remedied in the commercial implementations through the design of customized hardware.

BEST COPY AVAILABLE

Users are assigned unique "Personids" which identify them to the computer. The user chooses a secret password (which may be changed at will) and is required to give it correctly each time he logs on to the computer. Users also operate under projects. For example, the nickname of the program for gifted students described here is "Shad" so the students from the 1984 session are classified under "Shad84".

There is excellent control over who may or may not send mail. By default, a user's mailbox is open to anyone, but he may disallow access to particular personids at any time. There is also a mechanism to allow or prevent urgent messages from appearing on the screen while the user is working on something else. Finally, the email system provides for such niceties as mail forwarding, carbon copies, blind carbon copies, registered mail, and the (sometimes very valuable!) ability to retrieve and delete a piece of mail that has not yet been read by the intended recipient!

There are three fundamental modes of electronic communication on Multics™:

- **send_mail**, which sends an ordinary email message to one or more recipients
- **send_message**, which permits interactive dialogue with a user who is presently logged on
- **forum**, which implements a cconf function

BEST COPY AVAILABLE

Familiarization

Initial instruction on Multics™ was given in a series of "hands-on" lab sessions during which students were encouraged to explore the various email facilities, and were coached by teaching assistants. They all reached a reasonable level of competence, and those seeking advanced information obtained it mainly from the prepared on-line help segments.

In addition to sending point-to-point electronic mail, any student could create a "forum" and announce it to the other students or to the (much-wider) Multics™ community. Within a few weeks of using the system, students had either created or joined a vast number of forums including:

Forum	Subject
am	Advanced topics in Multics™ OS use
apple	Special interest group on Apple Computers
bbs	Info on electronic bulletin board systems
cash	Ways to make money in spare time
compsoc	Computers and Society, discussion of ethics
debate	Online debates of current issues
hci	Human-Computer Interaction
lawcomp	Law and Computers
lisp	Using the lisp programming language
micros	Microcomputers
movies	Discussion/Reviews of movies
jokes	Jokes for mixed company
sp_jokes	Other jokes!
phones	Information on the telephone system
plato	Plato computer-assisted-instruction system
qa	Questions and Answers (about computers)
rock	Rock and Roll music
softbooks	Reviews of books on computer software
science	Anything scientific

BEST COPY AVAILABLE

scred	How to use the screen oriented editor
star_trek	For fans to the Star Trek TV series
swt	How to use software tools
tack_board	Things for sale
univ	Discussion on life at various Universities
weather	Discussion/debate about Canada's climate
world	World politics

Because of the Multics™ security features, it is possible, in fact likely, that many other private forums have been set up with participation limited to certain users. One particularly notorious example is "club," open only to the boys in the program, in which the major topic of discussion is -- the girls in the program!

Educational content

Obviously, much of this electronic communication is going on "just for fun" although that is not necessarily a bad thing. To focus on one of the more academically rigorous discussions, let's look at the "chain of transactions" in the LISP forum. LISP is a fairly obscure programming language used mainly for building Artificial Intelligence tools. If you surveyed 1000 professional computer programmers, I estimate that only one or two would be competent in LISP. Therefore, even in a University environment, finding someone to explain the intricacies of LISP is a non-trivial task. Here, in a transcript, edited for brevity, is how David Bremner, a 16-year old Shad student from Ganges, B.C., was able to obtain LISP training on-line:

[0001] (3 lines) Bremner.Shad85 06/26/85 2232
(ed. note: the above shows the transaction number, length in lines, author, date and time entered)

Subject: Reason for this meeting
I established this meeting because I thought there was a need for a gathering place for all the 'word-of mouth' documentation on LISP (Actually, I needed help!)

BEST COPY AVAILABLE

[0002] (2 lines) Bremner.Shad85 06/26/85 2236

Subject: Using the interpreter (help!)
Would someone please tell me how to read and write files from the interpreter?

[0003] (2 lines) Bremner.Shad85 06/27/85 0818

Subject: compiling stuff developed on the interpreter

I figured out how to save the environment, but obviously I can't compile a '.sv' file. Any suggestions?

(Ed. note: he's now asked two questions with no reply but one was forthcoming the next day....)

[0004] (37 lines) Schroth.SysMaint 06/28/85 1157

Subject: compiling stuff developed on the interpreter

There are two ways of developing LISP code under MACLISP:

1. edit and load source files into the environment.
2. create function definitions solely in the LISP subsystem and save them and later invoke LISP, the name of the sv.lisp created. Or, you can file_output the source and then edit and load the source file (or compiled object)

The easiest is option 1 above, use the editor of your choice to create foo.lisp Then
! lisp
! (load "foo.lisp")

(Ed. note: Well, that's enough of that one but it illustrates that sometimes, in the computer realm, it's

BEST COPY AVAILABLE

necessary to insert quotations of computer dialogue as above. Now another user joins in...)

[0005] (6 lines) Spitzer.Shad 07/08/85 1405
Subject: environment
Could someone give me a summary of the various commands used to manipulate the environment in LISP? There doesn't seem to be any commands for things such as loading and saving the environment, or printing out defined procedures in the MACLISP manual.

HELP!

[0006] (1 lines) Bremner.Shad85 07/09/85 1457
Subject: looking at defined functions
How do you look at a function in MACLISP after it is defined?

[0007] (34 lines) Schroth.Multics 07/09/85 15527
Subject: environment

(Ed. note: He gives a full technical answer)

[0008] (6 lines) Schroth.Multics 07/09/85 1528
Subject: looking at defined functions
If you entered it directly into the lisp interpretor:
(grindef fn)
This works for interpreted functions (i.e. those that you can define) It will not do any useful for system defined functions
[0008] (pref= [0006], nref = [0010])

(Ed. note, the above "chain information," edited out previously, links together answers to questions making it easy to follow them.)

[0009] (6 lines) Schroth.Multics 07/10/85 1413
Subject: LISP differences nfo
If you have the revised MacLISP manual, you may wish to

read:

>udd>sm>ds>info>lisp_difference.gi.info

This is the MR11.0 info segment that details the variations of Multics MACLISP from the PitManual.

(Ed. note: This provides a reference to a document also on-line on the system. It is much more efficient than mailing the document to each intended recipient or even "posting" it in the forum. All the user would have to do see the referenced information is type "print" followed by the string of hieroglypics given above (>udd....etc.)

[0010] (11 lines) Haggett.SysMaint 07/15/85 2015
Subject: Looking at defined functions
Note that the definitions one reads for various "system functions" are provided for explanatory purposes. Such functions are actually written in PL1 or ALM. As far as looking at functions goes, well, the best way to develop list is under Emacs. If you have to work under the interpreter, then it is quite easy to invoke Emacs to edit something, return, and reload the new definition. Coding and grinding under the interpreter is painstaking and unnecessary.

(Ed. note: And the chains go on and on...)

Analysis of the LISP forum

Clearly, the user with personid Schroth has taken on a "mentoring" role for novice LISP users, but others with knowledge are also contributing. Three weeks after the meeting was established, 32 users were attending. As shown in the following table, their projects (the information following the period in the personid) span a vast range from system maintainers (SysMaint) to Honeywell employees (HIS) and Computer Science Students (Cpsc and GCpsc.)

BEST COPY AVAILABLE

Table 1.
Users of the LISP forum after three weeks

```
:  Users of the >udd>Shad85>Bremner>Lisp_Notes meeting.
  Person                                Last [0013]    Last time attended
  AMah.Shad85                                [0000]    07/15/85  2356.1  mdt  Mon
  Armstrong.SysMaint                         [0005]    07/09/85  0842.1  mdt  Tue
  BCWuth.Tempacct                             *END*    07/18/85  2009.7  mdt  Thu
  BGress.CMGR16                               *END*    07/19/85  1553.4  mdt  Fri
  BNemeth.HIS                                [0009]    07/15/85  1117.5  mdt  Mon
  BWong.ASPD                                 [0003]    06/27/85  1142.4  mdt  Thu
  Barnecut.SysAdmin                          [0004]    07/13/85  2212.7  mdt  Sat
  Bremner.Shad85                             [0012]    07/18/85  1609.1  mdt  Thu
  DFreedman.Service                           *END*    07/19/85  0906.8  mdt  Fri
  Dewar.GCpsc                                [0009]    07/10/85  1442.4  mdt  Wed
  Elhard.ASPD                                 *END*    07/19/85  1634.9  mdt  Fri
  Fischl.Shad85                              [0009]    07/14/85  1455.6  mdt  Sun
  Gerke.Service                               *END*    07/18/85  1932.6  mdt  Thu
  Graw.Shad                                  [0010]    07/16/85  1121.7  mdt  Tue
  Hassett.SysMaint                           [0010]    07/15/85  2015.5  mdt  Mon
  Haider.Shad85                               *END*    07/20/85  0806.9  mdt  Sat
  Halladay.HIS                               [0003]    06/27/85  1127.1  mdt  Thu
  Hole.ASPD                                  [0010]    07/18/85  1054.9  mdt  Thu
  JPSavoy.OperDevel                           *END*    07/18/85  1728.3  mdt  Thu
  Jennings.Shad85                            [0004]    07/04/85  1103.5  mdt  Thu
  Keenan.Cpsc                                 *END*    NOW ATTENDING
  Kosari.Shad85                              [0004]    07/16/85  2032.1  mdt  Tue
  Luft.Mdcn                                  [0004]    07/01/85  0230.7  mdt  Mon
  Masrani.GCpsc                               *END*    07/20/85  0632.1  mdt  Sat
  Moloney.Shad                               [0003]    06/27/85  1831.2  mdt  Thu
  Pliniussen.Shad                            [0004]    07/01/85  2115.0  mdt  Mon
  Rosin.OperDevel                            [0010]    07/15/85  2247.6  mdt  Mon
  Schroth.SysMaint                            *END*    07/18/85  1720.6  mdt  Thu
  Spitzer.Shad                                *END*    07/19/85  0716.6  mdt  Fri
  Wagner.CCLS                                [0000]    07/02/85  1054.2  mdt  Tue
  Wagstaff.Service                           [0010]    07/16/85  1454.6  mdt  Tue
  Wellings.Service                            *END*    07/19/85  0816.0  mdt  Fri
```


BEST COPY AVAILABLE

It is interesting to note that Haggett.SysAdmin (who entered transaction [0010]) lives in Paris, France. He provided an answer on July 15th to a question that was asked on July 9th. Had the two users been logged on simultaneously, they could have conversed interactively and probably settled the matter on the spot. Even with the six day delay, this medium is clearly superior to conventional mail service, and can offer a considerable cost saving since communication is done via data networks, not voice-grade telephones lines.

Interactive authoring

Many books and research papers are now being co-written by authors who live in different places. In some cases, they may never have met except on the computer. We commissioned a project in electronic authoring -- the preparation of a book detailing the adventures of the Shad students from the 1984 program for the year following the end of their stay on campus. It was edited by people in Ottawa, Ontario; Calgary, Alberta; and Saint John, New Brunswick. The final copy was printed in Calgary. (This idea is also being used by newspapers such as The Globe and Mail, which take stories from reporters electronically and assemble the paper for printing at a central location.)

This 120-page document, which they called "The Supplement", is about 95% computer printout with the occasional handwritten letter and drawing. It could have been distributed electronically but it was decided to print it so that those who did not have access to the computer could enjoy it. Many of the entries are logs of electronic conversations. One of the most interesting shows the proprietary feeling the students developed for "their" electronic communication system. At one point the Program Director created a new personid (called "X" in the following) and logged on. The students frequently quiz new users on the Shad project, assuming they are potential friends. Here's what happened:

BEST COPY AVAILABLE

(A,B, and C are authorized students users. X is the Program Director impersonating a "hacker")
C: Hello, how'd you like to enlighten a curious person from vancouver and introduce yourself?

X: I am a 14 year old "hacker" in Dallas, Texas connected via mailnet and bitnet through an arpanet gateway...who are you?

C: 17 year old "semi-hacker" in Vancouver connected through datapac. What's you're name?

X: This is a neat system you have.

C: We like it.

(Ed. Note: Sometimes the replies on email get out of phase with the questions due to over-eager typing.)
X: Larry... are you hacking too?

C: (to A) He says he's a 14-year old hacker from Dallas.

C: (to X) How'd you get an id?

X: Like do you pay to be on this?

C: Not much I don't

X: I created it for myself. Got any phone numbers to trade?

B: (logs on and joins in) Hey dude, who are you? If you are from Texas then you should be shot.

X: Who are you?

B: I'm a teaching assistant, big guy. 6 feet 4.
(Ed. Note: This is highly contrary to fact!)

BEST COPY AVAILABLE

X: You got any numbers to trade? I have one for Intel Corporation in California, Unix v 55 system.

B: No Way! I won't deal with a hacker on my system. You're a cocky SOB aren't you?

A: (another student logs on, this one with a more literary bent) WHAT MAN ART THOU, SO STUMBLEST ON MY COUNCIL?

(Ed. note: it continues in the same vein. They finally figure out who I am -- by my distinctive typing style!)

In an "April Fool's" joke, the students were told that their access to the system, which was scheduled to last at least a year, was being terminated in a week's time. Their reactions were swift and surprisingly emotional:

"My life line has been severed"
"I feel like my dog just died"
"I can't bear the thought of no Multics"
and this last, from a notoriously frugal student:
"I may even be willing to pay for the joy of Multicisizing'

This echoes a remark made by Prof. Jacob Palme[3] that he feels strangely sad and cut off from the world when he is unable to access his Computer Conferencing System. Dr. Palme raises the issues of "balance of control" in electronic mail systems, stating that "in a system where the communcation process is too much controlled by the sender of the information, problems with information overload will often occur."[4] He recommends a working party size of 30-100 for computer conferences.

These issues were addressed in this experiment by restricting the use of many aspects of the conferencing system to the 50 students plus 10 staff members. The vast majority of messaging was within our group, although, as shown above, "outsiders" did participate.

BEST COPY AVAILABLE

Each user could also control his information flow by:

- -locking up his/her mailbox selectively
- -deciding which forums to attend
- -turning off interactive messages
- -choosing to defer reading mail until a convenient time.

This appeared to provide adequate protection against the sometimes horrendous problems experienced by users of conference systems that are open to a wide public.[5]

Special Email conventions

Electronic mail conversation lacks many of the body language cues of normal conversation. For example, a smile or gesture may effectively indicate irony or outrage. The students in this study knew each other personally before taking up their electronic relationships, but they still had to evolve certain methods of qualifying their "electronic speech."

An almost universal need is for a character to indicate "I'm only joking." Most email users have settled on the "rotated happy faces" convention, viz.

:-) Do you still beat your wife? (-:

It has a "clone" :-] which is not quite as suggestive. And of course, the antonyms, indicating the opposite of levity, are :-(and :-[

To indicate exaggeration, the asterisk is often used:

This is a *billion dollar* idea!

Frequently used phrases get abbreviated as in:

- BTW - By the Way
- CU - See you later

BEST COPY AVAILABLE

One exuberant student has a heavy finger on the ! key so her messages look like:

Yahoo!!!

was minimal. However...one of the students invented a program called "graffiti" which sent thousands of messages to a designated recipient. This proved an annoyance for a day or two until an even brighter student invented a program that provided "graffiti immunity" by locking the offender out of a mailbox if there was an attempt to send more than five messages in a short interval.

The electronic equivalent of hanging up on someone, by the way, is to deny access to your mailbox. Suffice it to say that this was regarded as a serious insult by the students in the program.

Bringing outside experiences onto the system

One interesting consequence of the conferencing system is that when one student read an article, attended a seminar, or learned something interesting, he or she would often take the time to type it into a forum, often in point form. Here is one example:

Notes from a seminar attended by GEChurch:

ACTION STEPS OF ACHIEVEMENT

-Do high priority work first.
-The reason people spend their time on low priority busy work is that it is easier to do.
-If you fail the first time, do it again (different from "try" it again)
-If you fail a second time, check your information

Conclusions

1. Electronic communciation provided a valuable means for these gifted students to continue their interaction.

2. A number of joint projects have evolved, including the building of a more sophisticated conferencing

BEST COPY AVAILABLE

system for Multics™. This potential for working together at a distance is particularly valuable in the computer field, but could be applied to any discipline in which the result is some written report or project.

3. While students used both email and cconf facilities, the former seemed to lend themselves better to specific tutoring (for example, how to use an editor,) while the latter were better for general questions, particularly when it wasn't known who had the answer.

4. Students developed a strong "brand loyalty" and have resisted attempts to shift them over to other electronic communication systems which they consider less sophisticated.

5. Students went to great lengths to maintain their electronic links, including buying computer equipment and paying long-distance phone charges.

In comparing the 1984 group (which was communicating electronically only,) with the 1985 group (which was living on campus and using email,) the 1984 group's use was approximately ten percent of the 1985's (421 units versus 4200 units in a six-day period.) This must be understood in the context that those on-campus were currently involved in a full-time program whereas those using the computer remotely were living at home, and had graduated from the program a full year earlier. Also, much of the 1985 use was for computationally intensive programming as opposed to email and cconf.

SP026775

6. The experiment was clearly perceived as enjoyable by the students, as witness the fact that thirty of the fifty 1984 students paid a small voluntary fee to be kept on the system. (Some of the other 20 did not have access to computer equipment or Datapac™ lines.)

7. A major aspect that has not been explored, but should

BEST COPY AVAILABLE

be, is what these students could accomplish if they also had access to excellent databases of research information. (A small pilot study was done in 1985 using the "After-Dark" facilities of Dialog® and the students were able to find the answers to a number of technical and business questions in the space of two afternoons.)

1. Further information on the C.C.C.T. program may be obtained from:

Dr. Derek Lane-Smith
President
Canadian Centre for Creative Technology
415 Phillip Street
Waterloo, Ontario N2L 3X2
Canada
(519) 884-8844

2. For example, general or detailed information on any command is obtained by simply typing "help" followed by the name of the command. If the user is unsure of the exact name of the command "list_help" will present all items of help information containing a particular keyword. There is also a "Multics™ tutorial" but most of our students, being gifted, found it too slow-paced.

3. Palme, Jacob "Computer Conferencing is More than Electronic Mail," in Proceedings of Computer Conferencing and Electronic Messaging, University of Guelph, January 22-23, 1985, pg. 3-10.

4. Ibid.

5. For example, the ENVOY/100 system operated by Telecom Canada. I cancelled my account largely because of the annoyance of receiving (and sometimes paying for the storage of) unsolicited messages from people I didn't know.

Acknowledgements

The author is extremely grateful to:

The Canadian Centre for Creative Technology, for organizing the Shad Valley Program

The University of Calgary, for providing the computer facilities used in this study

The Natural Sciences and Engineering Research Council of Canada, for a grant on Computer Security under which the he security-related part of the experiment was done.

BEST COPY AVAILABLE